





CSB Investigations and Safety Culture

8/20/2012



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WHAT IS THE CSB?

- An independent U.S. federal agency
 - investigating chemical accidents
 - promoting prevention – public knowledge
- Authorized by Congress in 1990
- Five Board Members; approx 45 staff
- Modeled after NTSB
- Intent of CSB investigations are to get to root cause(s) and make recommendations toward prevention
- Not regulatory; no enforcement authority



CSB Investigation Approach

- Formal analysis to identify underlying technical, human factor, management system, organizational and regulatory causes of the incident.
 - Beyond immediate technical events and individual actions
 - Focus is on improving safety NOT assigning blame
- Addressing the immediate cause ONLY prevents that exact accident from occurring again.



Investigative Approach

- Analysis of Safety Systems
 - Not just how they are set up but how the systems work in real life (interviewing employees at all levels within organization)
 - Why conditions or decisions leading to accident were seen as normal, rational, or acceptable prior to the accident
- More emphasis on Organizational and Social Causes
 - Safety culture
 - Organizational Structure
 - Cost Pressures
 - Regulatory Gaps and ineffective enforcement
 - Performance Agreements or bonus structure

BP Texas City

- March 23, 2005
- Blowdown drum
- Liquid hydrocarbon
- Vapor cloud explosion
- 15 deaths/180 injuries
- Baker Panel





Baker panel findings

- BP had not provided effective **process safety leadership**
- BP had not established an **open trusting relationship** between management and the workplace
- Lack of a unifying process **safety culture**
- **Personal Safety emphasis**; not process safety
 - Reliance on low LTIR gave misleading risk indicator
- Cost cutting pressures seriously degraded infrastructure
 - Mgmt failed to assess impact of cost and staff reductions on safety



Safety Culture Attributes

- the degree to which the **workforce feels “empowered”** as to process safety
- the extent to which the workforce feels free to **report safety-related incidents**
- the **process safety awareness**, knowledge, and competency of the workforce;
- relationships and **trust** between different workforce / management and contractors
- whether **deviations** from policies and procedures are tolerated;
- the extent of **information flow** at all levels
- whether the workforce has a **shared belief that safety comes first**, regardless of financial, scheduling, or cost objectives; and
- the extent to which the workforce is **vigilant about process safety risks**, continuously tries to reduce them, and seeks to learn from incidents and near misses.



Percentages of Disagree/Tend to Disagree Responses to Survey Item: “I believe a culture exists at this refinery that encourages raising process safety concerns.”

	Carson	Cherry Point	Texas City	Toledo	Whiting
Operators	8	1	23	30	9
Maint	15	2	23	38 (*)	9
HSE	3	4	29	16 (*)	13
Engineering	5	4	17	15	8
Ops Mgt	0	5	7	7	5
Maint Mgt	0 (*)	0 (*)	16	**	0



Percentage Disagree / Tend to disagree:

“After a process related incident, accident or near miss, management is more concerned with correcting hazards than assigning blame or issuing discipline”

Category	Carson	Cherry Point	Texas city	Toledo	Whiting
Operators	16	7	46	50	25
Maint	18	5	44	60 (*)	21
HSE	3	0	27	5 (*)	10
Engineering	5	0	15	15	0
Ops Mgt	5	0	17	5	7
Maint Mgt	4 (*)	0 (*)	24	**	9



Percentage Disagree / Tend to Disagree:

“When a process safety issue is involved, I can challenge decisions made by supervisors without fear of negative consequence”

Category	Carson	Cherry Point	Texas City	Toledo	Whiting
Operators	12	9	28	25	17
Maint	16	12	30	25 (*)	23
HSE	0	4	17	16 (*)	10
Engineering	8	4	10	19	5
Ops Mgt	2	7	9	9	5
Maint Mgt	0 (*)	6 (*)	16	**	3



Deepwater Horizon (DWH) Incident

- April 20th, 2010
- 11 deaths
- 17 serious Injuries
- ~5 million barrels of oil spilled in Gulf
- Tremendous Economic Impact





Personal vs. major hazard safety

- BP and Transocean primarily measure safety performance using worker injury data
- BP executives on the rig to mark safety record
- Safety bonuses and awards are largely based on injury data

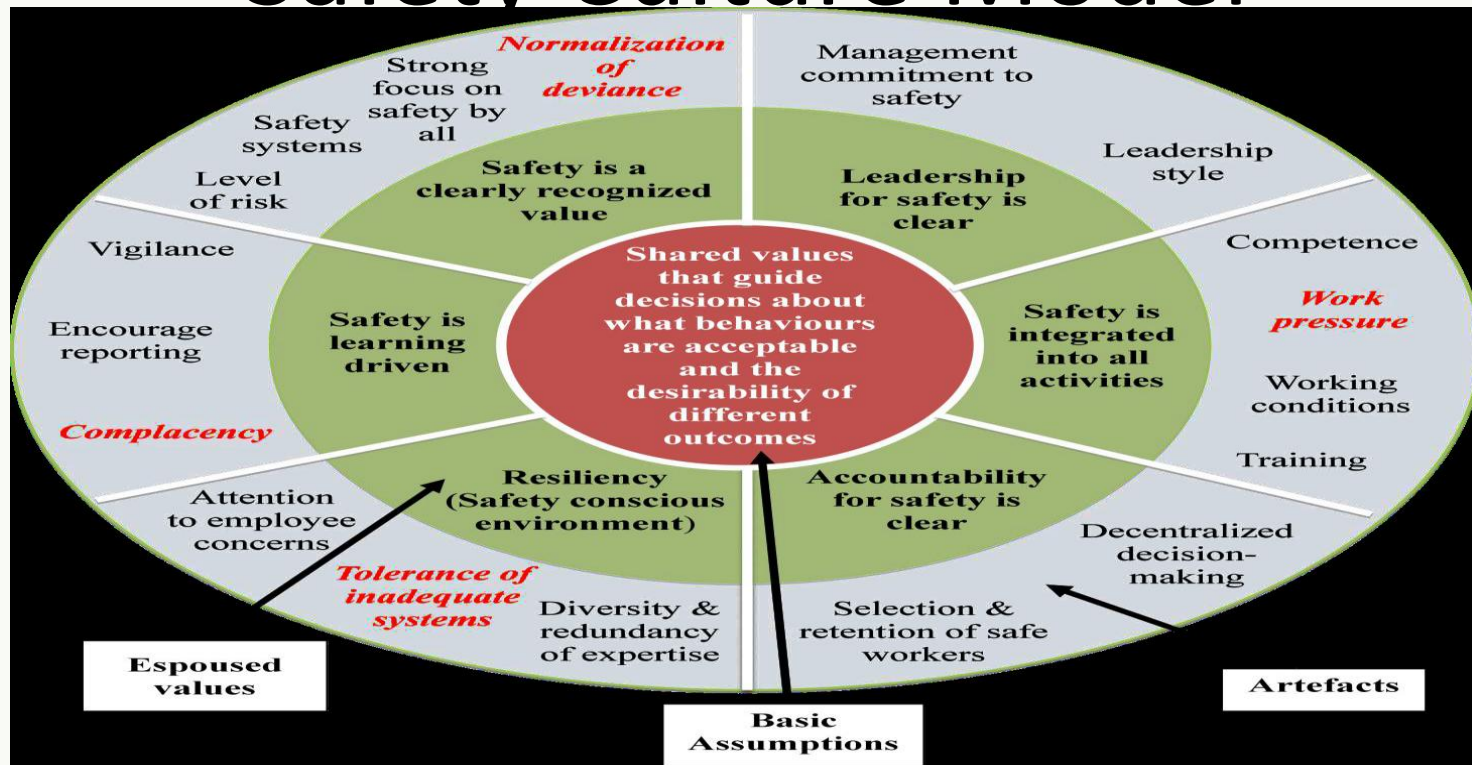


Safety Culture

- Big risk for big reward
 - Commercial risk vs. safety
- Plan for worst
 - Considered 'low' safety risk; environmental mitigation focused on spill vs. stopping a well flow
- Focus on personal safety
- Pay attention to warning signs
 - Prior incidents
 - Prior audit reports
- Question data and pay attention to anomalies
- Raise concerns ; stop work authority
- Complacency – no 'big' accidents so start to not be concerned with little things
- Normalization of Deviance (acceptance of deviance)



Safety Culture Model





Safety Culture and Safety Outcomes

- Study Conducted by Mark Fleming of Saint Mary's University, Canada
- Reviewed 17 offshore disasters to identify cultural causal factors
 - 14 contained cultural causes
 - Tolerance of inadequate systems or resources (10)
 - Normalization of deviance (9)
 - Complacency (8)
 - Work pressure / cost (4)

Chemical Facility Incidents

DuPont Yerkes
New York

Hot Work Incident

Found inadequate
PHA



September 26, 2012



Challenges going forward

- Personal Safety vs. Process Safety and safety culture
- Impact of Regulatory Oversight
- Need to integrate 'safety' into production; not an extra layer -
- Measurement of safety culture
- Issue of multiple cultures
- Management of Change and Safety Culture
- Delta of what is thought to be happening and what is happening



Contact the CSB

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